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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,063	09/03/2003	Herman Leonard Offerhaus	30394-1102	8825

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EXAMINER	
CHANG, AUDREY Y	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 05/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/657,063	OFFERHAUS, HERMAN LEONARD	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on th cover sh t with the correspond nc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-4 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 9/3/2003.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on September 3, 2003 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1-4 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was **not** described in the specification in such a way as to **enable** one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims fail to teach how could a coherent laser beam be generated by using a series of laser diodes, a hologram and a mirror for reflecting "some of the secondary coherent light emission" back to the diodes, as recited in claims 1 and 2. Certain kind of phase-locking for the laser diodes seems to be needed in order to achieve such feature.

The specification and the claims fail to teach how could "an *image* of an interference pattern" is contained in the hologram. It is known in the art that the hologram is the recording of the *interference* pattern, not image of it.

The specification and the claims also fail to teach how could the hologram being recorded by having this "photoreflective (should be photorefractive) crystal" recited in the claims.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

The phrase "when illuminating the hologram with the primary light emission the hologram *reflects* the secondary coherent light emission" recited in claims 1 and 2 is wrong. The secondary light emission is a playback or *reconstructed* light emission by the hologram.

The phrase "tertiary light emission ... **contrary** to the primary light emission but has the same phase relation" recited in claim 2 is confusing and indefinite. Firstly, it is not clear what does it mean by "contrary" to the primary light emission. That is to say what particular properties of the tertiary light emission is "contrary" to the primary light emission. It is not clear if contrary means opposite to it or what. Secondly, what does it mean by having "same phase relation" ? The same phase relation is measured with respect to what ?

The term "photoreflective crystal" recited in claim 3 and in the specification is *wrong*. It should be read as "photorefractive crystal".

Claims 3-4 are completely confusing and indefinite, since it is not clear what does the "photoreflective crystal" has anything to do with the making of the hologram. It is not clear if the

interference pattern has already formed before the primary beam is concentrated to the photoreflective crystal or not ?

Clarifications are required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Roess (PN. 3,763,441) in view of the patent issued to European Patent Application (EP 0 176 329) by Ritter et al.

Roess teaches a device for *phase-synchronization* of *several laser oscillators* wherein the device comprises a *plurality of laser diodes* (1 and 2 in Figure 1), which generate a *first primary light emission* incidents on a *hologram* (5), serves as the *system for transforming* the primary light emission into a *secondary coherent* light emission that is then directed to a *mirror* (6). The mirror reflects some of the secondary light emission to make it passes through the hologram and to generate *tertiary light emission* back toward the *plurality of laser diodes*, which serves as *the feedback signal for the diode lasers,* (please see column 2, lines 15-62). Roess teaches that the hologram superposes the primary emission from all of the laser diodes to form a *single* summation wave which is *coherent* and phase-synchronized, (please see column 2, lines 23-27). The hologram contains an *interference* pattern that is created by the *interference* between the a *spherical wave* and a *series of spherical waves that generated from the plurality of laser diodes*. From the standard knowledge of holographic art, the secondary coherent light emission, when reflected from the mirror (6) will act as reconstructing light beam to play back the tertiary light emission

that is conjugated to the primary light emission. The tertiary light emission will act as the *feedback* signal to induce emission in the laser diodes. This implies the light wave used to generate the hologram is the primary and secondary light emission.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the hologram is of a *reflection* mode. However to make the hologram either of reflection mode or transmission mode does not change the essential operation of the device and the none-critical differences between the two modes is the geometric arrangement of the device. **Ritter** et al in the same field of endeavor does teach explicitly to use a *reflective holographic grating* (70, Figure 5) for reflecting back the feedback signal directly from the reflective hologram to modulate the laser diode source. It would then have been obvious to one skilled in the art to apply the teachings of Ritter et al to modify the arrangement of the device of Roess to accommodate a reflective hologram instead of a transmissive hologram for the benefit of reducing the size and the number of elements used in the device.

8. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Roess in view of the patent issued to Psaltis et al (PN. 5,959,747).

Roess teaches a device for *phase-synchronization* of several *laser oscillators* wherein the device comprises a *plurality of laser diodes* (1 and 2 in Figure 1), that generate a *first primary light emission* incidents on a *hologram* (5), serves as the *system* for *transforming* the primary light emission into a *secondary coherent light emission* that is then directed to a mirror (6). The mirror then reflects some of the secondary light emission back through the hologram and generates *tertiary light emission* toward the plurality of laser diodes that serves as the feedback signal for the diode lasers, (please see column 2, lines 15-62). Roess teaches that the hologram superposes the primary emission from all of the laser diodes to form a *single* summation wave which is *coherent* and phase-synchronized, (please see column 2, lines 23-27). The hologram contains an *interference* pattern that is created by the *interference* between the a

spherical wave, serves as the *reference signal*, and a series of spherical waves that are generated from the plurality of laser diodes, which is the primary light emission. It is implicitly true that the hologram is formed in a *recording medium* that is *transparent* or *partially permeable*. The primary light emission that includes the light waves generated from the plurality of laser diodes is diffracted by the hologram wherein the diffracted beam, or the secondary light emission is reflected by the reflector (6) and the reflected light acts as a reconstructing light that illuminates the hologram to create a light emission that is phase-conjugated to the primary emission and serves as the feedback signal to the laser diodes.

This reference has met all the limitations of the claims with the exception that it does not teach to use a self-pumped photorefractive crystal as an alternative means to modulate the undiffracted primary light emission to create a light emission that is phase-conjugated to the primary light emission to serves as the feedback signal. However using self-pumped photorefractive crystal as phase conjugator to create conjugated light beam in holographic art is rather well known. **Psaltis** et al teaches explicitly that a self-*pumped photorefractive crystal* $BaTiO_3$ is used as the phase conjugator (332, Figure 3b) such that a reference light beam (320) passes through the hologram (302) is directed to the phase-conjugator wherein a *phase-conjugated beam* (321) is *returned* by the conjugator, (please see column 8, lines 12-42). It would then have been obvious to one skilled in the art to modify the device of Roess to use a self-pumped photorefractive crystal as an alternative means for the phase conjugator to generate the phase conjugated primary emission as the feedback signal for the laser diodes. With regard to claim 4, Psaltis et al teaches that a lens (334) is used to focus the light (320) to the photorefractive crystal.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.